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The wild cotton plant (Thurberia thespesioides) in Arizona

VERNON BAILEY

(WITH TWO TEXT FIGURES)

The wild cotton plant, which harbors a native cotton boll weevil *Anthonomus grandis Thurberiae*,* is common in certain localities in the mountains of southern Arizona. To determine the vertical, or zonal, range of the plant and weevil I visited, from October 19 to November 15, many of the mountain ranges where the plant was known to occur and others where it might occur, and gathered such data on its distribution, abundance and habits as the limited time would admit. Additional information was obtained from Professor J. J. Thornber, of the State University at Tucson.

DISTRIBUTION

The plant was studied mainly in the Santa Catalina and Santa Rita Mountains, and in the mountains about Globe and Roosevelt. The Dragoon, Graham, Pinal, Tortilla, Salt River, and Date Creek Mountains were visited without finding it.

In Sabino Canyon, on the south side of the Santa Catalina Mountains, where both *Thurberia* and the weevil are abundant, the limits of range on various slopes were worked out with great care. These limits are given in some detail as the subsequent localities showed little or no extension of zonal range. The lowest *Thurberia* plants found were at 3,600 feet on a west slope, 600 feet above the bottom of the canyon, and they were common at 3,800 feet on other west slopes. On open southwest slopes in the upper part of Sabino Canyon they began at 4,000 feet and extended up to 5,000 feet in the upper division of Lower Sonoran zone. That is they range from the upper limits of giant cactus and paloverde to the lower limits of juniper, nut pine, and Emory oak. This range seems to hold true except that *Thurberia* occurs, so far as I can learn, only on south, west or east slopes and consequently does not go so low as do most of the plants of its zonal subdivision which range over the colder slopes. It does not usually occur near the bottoms of canyons but prefers the hottest, dryest open slopes or open side gulches in rocky situations. Its range, however, is not continuous even in the most favorable parts of its own belt, as it occurs only in interrupted areas on each of many isolated and widely separated mountain ranges. It is therefore especially important to know the more abundant plants with continuous ranges which mark its subdivision, so as to know where to look for it.

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* Pierce, Jour. Agr. Research 1: 90. 10 N 1913.

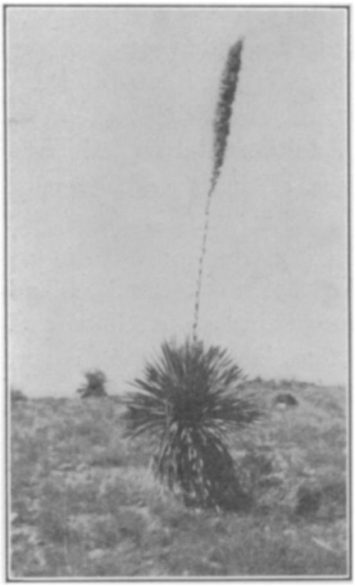

FIG. 1

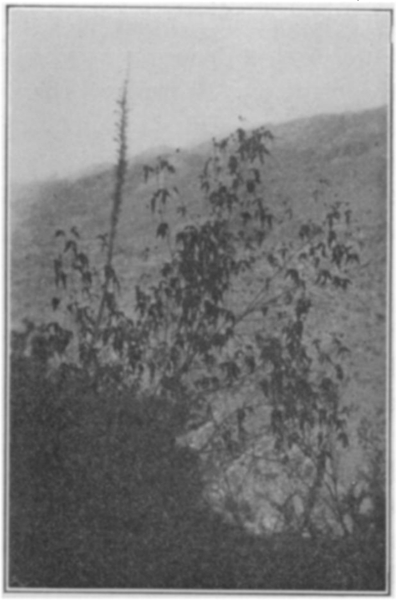

FIG. 2

FIG. 1. *Dasylirion Wheeleri;* near Globe, Arizona. November, 1913.

FIG. 2. *Thurberia thespesioides;* in Sabino Canyon, Santa Catalina Mountains, Arizona. October, 1913.

The most conspicuous plant with which *Thurberia* seems always to be associated, is the sotol (*Dasylirion Wheeleri*). This has the same lower limit but runs a little higher and overlaps the lower edge of Upper Sonoran zone. The sotol is a very abundant and conspicuous plant, fully encircling most of the mountain ranges that reach above Lower Sonoran zone.

Other plants generally associated with *Thurberia* and marking its belt are given in the following list. Still others from the upper and lower zones overlap and mix with it or extend below or above it on colder or warmer nearby slopes. The presence of several of the following species is a good indication that *Thurberia* may also occur in the same locality:

Dasylirion Wheeleri
Quercus oblongifolia
Vauquelinia californica
Anisacanthus Thurberi
Acacia suffrutescens
Calliandra erophylla
Erythrina flabelliformis
Dodonaea angustifolia
Crossosma Bigelovii
Tecoma stans
Rhus mollis
Atriplex angustifolia
Aesclepias linearis
Chrysoma laricifolia
Brickellia californica
Abutilon Lemmoni

In the Santa Rita Mountains *Thurberia* is abundant on side slopes of Stone Cabin Canyon, mainly on east and west exposures, from 4,000 to 4,500 feet. A few scattered plants were found on banks along the stony-sided dry wash, but they were most abundant on steep, open, very stony, east and west slopes. None were found on north slopes which otherwise seemed just as suitable for it, and there were no real south slopes at this end of the range. The almost level plain at the northwest base of the mountains comes up to 4,000 feet, which prevents the plant from going lower, as it might otherwise do. The plants with which it is most closely associated here are mainly the same as in the Santa Catalina Mountains. Sotol and the blue oak are invariably with it, but also range higher. It is found side by side also with *Prosopis velutina* of Lower Sonoran and *Mimosa biuncifera* of Upper Sonoran, both of which overlap along the edges of the zones.

Near Globe, north of the Gila Valley, *Thurberia* is abundant with the sotol among big granite boulders on a steep west exposure a mile north of the town. It begins near the railroad at the bottom of the slope at 3,500 feet and extends up to 3,800 feet. Giant cactus grows on adjoining southwest exposures and junipers on an adjoining northeast exposure close by at the same level.

Near Fish Creek Canyon, on the stage road from Roosevelt to Phoenix, there is an extensive area of *Thurberia* which O. F. Cook and E. W. Hudson have carefully examined. I went through this in the evening when it was too dark to identify many of the plants, but giant cactus and sotol occupy slightly different exposures in such close proximity as to appear all mixed up. Mr. Hudson marked the range of *Thurberia* along this section on the contour map, bringing it down to about 2,500 feet in places on the canyon sides but showing most of the range to be on dry slopes and mesa tops at about 3,000 feet. This region is so exceedingly rough and broken that the zones are hopelessly mixed and run abnormally high and low.

The plant has been collected in several other mountain ranges but many of the records are so indefinite as to be of little use in defining its zonal range. Professor Thornber showed me specimens from the Rincon Mountains (Manning Trail), the Mule Mountains, Dragoon Summit and Fort Bowie. In the National Herbarium there are specimens from the Rincon Mountains at 4,500 feet altitude, Davidson Spring, Arizona (collected by Dr. Rothrock in 1874), and from the Mexican Boundary Line south of Bisbee (collected by Dr. Mearns in 1892), and from some of the localities previously mentioned. There are also specimens labeled "Arizona" and one labeled Mexico.

Localities where *Thurberia* has been found in Arizona have been indicated on maps and colored belts drawn to show where it has been, or is likely to be, found at irregular intervals. These belts represent sections of the upper division of Lower Sonoran zone but are carried out only where it occurs on mountain slopes with south, west or east exposures. The plant has not been found, so far as I am aware, on the northern, or cold, slopes of mountains nor in open valleys or plains country.

THE PLANT

The plant is a shrub, usually four to ten feet in height, with a woody stem often two inches in diameter. It has an open, spreading top, deeply cut three-lobed leaves, large pink flowers and small naked capsules, which resemble little cotton bolls without enveloping squares. The capsules are full of naked black seeds and a little fuzzy cotton fiber clinging to the inner walls. The plant blossoms late in summer and on October 19, in Sabino Canyon of the Santa Catalina Mountains, the flowers were gone. The bolls were practically all full grown with ripe seeds and a few had ripened sufficiently to open. By October 26 in the Santa Rita Mountains many of the bolls had ripened and opened, and on November 5, near Globe, they were about half opened. The uninjured bolls do not drop off when ripe but stand erect and open so that the seeds are gradually scattered by the wind. Many plants carry old and empty last year's bolls. The young branches of the plant are herbaceous in appearance and the woody stems are rather soft and brittle. One trunk an inch in diameter has seven or eight annual rings.

In places some old plants show evidence of having been grazed down by stock during previous seasons. New sprouts have come up from the old stumps and the plants are thriving, but the evidence that stock eat the plant, even down to the woody stems, suggests a cause for the present absence of *Thurberia* from open land, and its restricted habitat on steep and usually very rocky slopes. In most of the places where I have seen the plant in any abundance it was growing among big rocks where cattle could not get at it. In this extremely arid region an edible and unarmed shrub does not stand much chance where cattle are driven to eating many rank tasting and thorny bushes and even the spiniest cactus plants.

From the great abundance of seeds ripened and scattered abroad each season it would seem that the plant should reproduce itself profusely. That it does not may be due in part to the abundance of sparrows which winter in the foothills and are eagerly searching for such good sized and edible seeds as *Thurberia* yields, and in part to the numerous mice which probably get most of the seeds that the sparrows do not find.

THE BOLL WEEVIL

The weevil was abundant throughout the vertical range of *Thurberia* in Sabino Canyon in the Santa Catalina Mountains and in Stone Cabin Canyon in the Santa Rita Mountains. The bolls occupied by weevils do not open when they ripen, or dry up, and each of these unopened bolls almost invariably contains a weevil.

Many were gathered and brought back in tin cans. No weevils were found outside of the bolls which were ripening when

I first saw them October 19, and were mostly ripe when last seen November 6. Weevils have been found also in other canyons of the Santa Catalina, Rincon, and Santa Rita Mountains, but have not been found north of the Gila. At Globe I spent nearly a whole day examining thousands of bolls without finding a trace of weevils. Cook and Hudson did not find them in the Fish Creek region.

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